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Combat Crew

Strategic Air Command

FEBRUARY 1986

★★★★

Combat Crew

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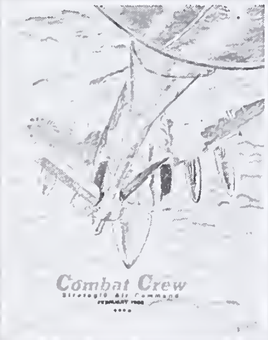

ON OUR COVER

Conducting a probe and drogue air refueling with an F-4 is a relatively routine occurrence for KC-135 tankers. What could go wrong? Turn to page four and find out.

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COMBAT CREW is an internal publication of the Strategic Air Command with the primary purpose of promoting safety. The contents of this magazine are informative and not to be considered as directive in nature. Facts, testimony and conclusions of all mishaps printed herein may not be construed as incrimination under Article 31 of the Uniform Code of Military Justice. All names, dates and places used in conjunction with mishap stories are fictitious. Written permission must be obtained from Headquarters, Strategic Air Command before any material may be reprinted by other than U.S. Air Force organizations. Use of funds for printing this publication has been approved by Hq. USAF. Distribution FX. controlled by IGFE SAC units submit distribution requests through local PDO. Reader to copy ratio 10:1. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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"1985 – SOM

"Stay Alive In '85 — Keep Safety First." That was the slogan we adopted as the Command safety theme some thirteen months ago. The good news is that the vast majority of our far-flung population took that message very seriously and were here to help celebrate the New Year. The bad news is that 56 of our number will never see another year begin because of tragic mishaps which were almost entirely avoidable. Ten crew members lost their lives in flight mishaps and 46 people died in ground accidents ranging from the bizarre to the all too familiar.

It is, of course, easy to argue that two Class A mishaps in over 340,000 flying hours is a splendid record. From the narrow perspective of commendable statistics, that's true enough. Conversely, the cold, hard facts of the matter leave but one conclusion — neither of these mishaps ever should have happened. The fact that they did should be a sobering thought for all of us — how in our enormously responsible profession can such things transpire? Every crew member, every supervisor, every commander should make it their personal business to think through that question. Are you prepared to react calmly and effectively in any conceivable emergency, both individually and as a member of a team? Are your convictions sufficiently strong that you will speak up forcibly when danger lurks or directives are being violated — no matter what your position on the crew? Are you fully prepared for every flight, no matter how seemingly routine? Have you developed the depth of knowledge, iron self-discipline and attention to detail that distinguish the true professional? And, do you, as a supervisor **really** know your people? Have you flown with them to actively search for the quirks and person-

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E PARTING THOUGHTS"

ality traits that under unusual circumstances can lead to ruinous behavior? Are you especially alert when last minute changes crop up, when pressure mounts or when the weather turns suddenly sour? There is absolutely **no** room for complacency where aircraft, missiles and weapons are concerned. Too much depends on us to ever be less than the very best we can.

Looking again over the roster of forty-six ground fatalities triggers an equally frustrating sense of loss and puzzlement. While a handful of people died purely as victims of someone else's irresponsibility, the vast majority clearly created the conditions of their own death. And, in most of these cases the dominant factor was alcohol abuse — drunk driving. It is hard to imagine that otherwise intelligent, educated and sensible people continue to willfully ignore the laws of physics and physiology, and turn automobiles into hurtling machines of destruction. Of course, we know the answer. For too long in this country, drunk driving has been either encouraged, ignored or condoned. Despite all the senseless waste, alcohol is still glamorized, and intoxication treated as good, clean fun, in advertising, in film and, too often, in organizations like our own that ought to know better.

Alcohol abuse accounted for nearly 60% of vehicular fatalities in SAC last year. That is totally unacceptable and it poses a major challenge if we are to turn that terrible statistic around. That is why we have selected as our ground safety theme for this year some familiar words wrapped in a new package: **"Make A Vow in '86 — Alcohol and Driving Don't Mix."** That is why I have made anti-DWI initiatives an IG Special Interest Item. That is why I pressed so urgently to get our briefing entitled "Who's Gonna Drive You Home?" before the widest possible audience. That is why I ask every commander and supervisor to educate themselves about the insidious disease called alcoholism and to learn how to spot the drunk drivers — **before** they get into their car.

This editorial should not end on a low note. Too many people did too many things right in 1985 to ignore the fact that as the Air Force's largest major command, we set an extremely high standard for safe, responsible behavior. That's a standard we can be proud of — and one we can raise even higher in 1986. ★

Brig Gen George Lee Butler
HQ SAC Inspector General

What Could Go Wrong?

1Lt Kevin Whitman
97 AREFS, Blytheville AFB

There we were, our first TDY deployment as a crew and for three of us, our first overseas mission — a Coronet East dragging Marine F-4s behind our KC-135 tanker for probe and drogue air refueling across the pond. We had spent a week at Pease AFB, delayed by weather and receiver maintenance, trying to depart for Lajes AB, Azores, and then on to RAF Mildenhall. Our lobster appetite had long been satisfied and we were longing for a change of cuisine, as well as scenery.

As the navigator, it was my first overwater mission without an instructor looking over my shoulder (and laughing or crying, depending on the circumstances). But what could go wrong? After all, we had an inertial navigational system/Doppler navigational system (INS/DNS), we were going to fly within 200 nm of land for a third of the route, and finally, we were the number two tanker in the cell. No doubt, the other nav had twice the experience I had, or he wouldn't be lead, right? As it turned out, he was about a year behind me and we had, together, a grand total of 700 hours flying experience. No sweat, I had found Hawaii as a nav student, and the two of us should be able to find a tiny group of islands off the coast of Spain.

Finally airborne as a two-tanker cell, we conducted our rendezvous over Nantucket without incident. A third tanker had already picked up the six fighters and refueled them once before handing them over to us. Rendezvous complete, one F-4 was cleared in to contact position to test our refueling system, and we passed gas without any problems. Suddenly cell lead called an immediate BREAKAWAY. For the second time in as many flights, lead's drogue gushed torrents of gas, blinding the receiver pilot whenever refueling was attempted. Lead aborted, taking three fighters back with him.

"Well nav, guess who's lead now," I thought to myself. "Now I won't even have time to eat my lunch."

The INS was already starting to drift north, which I expected since on each of the four previous flights it had also drifted, just barely remaining within tolerances. The DNS was also drifting even a little faster — south, of course. Tuning up the radar to 240 NM scope, I tried painting the coast of Nova Scotia — nothing even faintly resembled land. It had worked fine at 50 NM range, but at 100 and 240, nothing.

"Pilot, boom, he just broke his damn probe off!"

"Co, nav, set the channel and frequency for Halifax VOR/DME." The DME locked on at 170 NM but neither the TACAN nor VOR provided a bearing.

"Well, DME is better than nothing," I thought.

I compared the 170 NM arc to the INS position — it was 5 NM north of the arc; the DNS position was 10 NM south of the arc. Best guess — put a most probable position (MPP) on the arc between the two computer positions, then update the DNS to that MPP and press on.

"Pilot, nav, begin air refueling in two minutes."

"Now maybe I can start working on some celestial precomps and get caught up."

The first fighter made contact, took his gas, and backed out — no problem. But when the second fighter came on —

"Tanker pilot, be advised number two can only take fuel in the center body tank. My wing tanks are empty and I can't transfer fuel to them. I'll have to be on the boom a little more often."

"How much fuel do you have at capacity?"

"About 750 NM's worth at any one time."

Number two fighter cycled on and off the boom uneventfully for about an hour and a half.

"Pilot, nav, turnpoint in 35 minutes."

The turnpoint was basically our equal time point, but we were just as well off continuing to Lajes as returning to St Johns AB, Newfoundland. Winds were northwesterly, 330° at 65 knots, so it was practically a direct headwind to St Johns. That particular day St Johns was closed for weather minimums, so if we had to divert for any reason, the nearest divert base was Gander AB, another 100 NM further to the northwest.

"Hey nav, do you think we'll be clear of this turbulence anytime soon?"

We were passing through an area littered with the remains of thunderstorms and it was a little bumpy for the number two F-4 pilot struggling to stay in the drogue. I knew it was definitely too bumpy to be shooting a celestial position when I fell off the sextant stool the second time.

"Pilot, nav, if number two can wait another 30 NM, it looks like we'll be through all this. All I see on the scope are a few dissipating rainshowers, and we'll be in the clear."

"Pilot, boom, he just broke his damn probe off!"

"Boom, pilot, how much is left? Can he still take gas?"

"It's gone! He kind of slipped off the drogue in that last rough spot, the probe bound up and snapped off! There's nothing left to pump gas into!"

"Nav, pilot, say present position, distance, and heading to Lajes. The two fighters just blitzed off into the clouds, climbing to FL 350 to

save gas, and they want a heading and distance direct to Lajes. Number two has about 700 NM's of fuel. I'm not going to try following them in these IMC conditions."

"Pilot, nav, standby."

Not really the words my aircraft commander wanted to hear at that moment. During the past few moments, I was trying to take some celestial shots to find out where I actually was five minutes ago. The INS/DNS positions were drifting farther apart, my confidence in my manual dead reckoning (DR) position was low after several weather deviations, and I was trying to refine my position with a sun shot, taken during the turbulence, no less.

Now, I was in trouble; I could tell because my palms were getting sweaty. I hadn't yet finished my celestial position (which was way out in the weeds anyhow because of the turbulence), so I wasn't too sure whether the INS, DNS, or my manual DR position was the best present position. This information was now about five minutes old and getting more outdated rapidly. I was flying off two strip charts (not taped together) and I wasn't quite sure what heading to give the F-4s across the missing part of the charts, or even what the distance was to Lajes. I also had not yet inserted Lajes into the INS/DNS waypoint coordinates, so I couldn't give a distance or heading from either of the computers. Worse, I wasted precious time trying to insert these coordinates while the present position was on "HOLD" from several minutes ago — an impossible task because the computer will not accept this information while on "HOLD." So, falling back on mental DR, the most accurate wind information available, and applying the scientifically precise TLAR (That Looks About Right) method of navigation, I came up with a "wag" to get the fighters headed in the right direction while I sorted things out.

"Pilot, tell them their heading is 130°, present position N43-00 W042-45, and distance 820 NM."

Blowing off the celestial work, I released the INS/DNS present positions and put out a most probable position splitting the difference between them and my manual DR. Plotting this position, inserting the coordinates for Lajes into the INS/DNS, and lining up my strip charts took a couple minutes, but finally I felt organized.

"Pilot, nav, tell them their distance was actually 760 NM, not 820. Heading is now 122°. Pilot, nav, do you copy?"

My interphone cord had come unplugged. My first indication was when I noticed the pilot yelling at me across the cockpit!

"Hey nav, are you awake back there? Plot this from our present position — 30 DME, bearing 167°."

"Pilot, nav, say again. My interphone was unplugged."

"I said, plot air to air TACAN distance 30 DME, DF bearing 167° from our present position and give the F-4s a new heading."

"Roger, pilot. Tell them their distance was actually 760 NM, not 820. Their heading now is 122°."

After plotting their current position from ours, I applied winds and variation to the desired course and gave them a new heading.

"Pilot, nav, their new heading is 120°, distance is 685 NM, present position is N42-35 W041-20."

We continued along the flight

planned route accompanied by the third F-4, made the turnpoint, and basically followed the pair of F-4s to Lajes, giving them headings, distances, and present position updates every few minutes. Eventually, the air to air TACAN broke lock and they were on their own. We gave them one last heading correction to 121°, and continued to talk to Lajes on the HF radio, trying to explain the emergency situation. At first, we had great difficulty obtaining clearance direct to Lajes for the F-4s. The controller could not understand that when the F-4s reached Lajes, one of them would not have any fuel on board.

The remainder of our flight was fairly uneventful. I finally got a decent celestial position, determined that the INS/DNS were both off (INS — 11 NM, DNS — 25 NM), updated the DNS, and altered the aircraft heading. When the islands appeared on the radarscope, we were 4 NM left of course. Coming down through the heavy overcast, our remaining F-4 pilot casually mentioned that he'd like to fly the approach on our wing, since his gyros had been inoperative since shortly after takeoff. No big deal to him evidently, but we really should have warned him before we put our landing gear down. Talk about a quick change of lead!

Fortunately, when we reached the O'club that afternoon, there were four very much alive Marines (one younger, slightly shaken looking one), sitting at a table eager to buy us dinner. By climbing to FL 350, jettisoning their wing tanks, and flying direct, they arrived with 25 minutes of fuel remaining in number two. They could've almost shot a couple of approaches. Due to our continuous heading updates, they were only 10° off heading at TACAN lock-on.

Of course, our day was not quite over yet. My aircraft commander and I had to explain why we had not aborted as a four ship cell to Gander (a little closer, but the winds definitely favored Lajes); why we had not continued as a four ship cell direct to Lajes (they blitzed off without us in IMC conditions). Looking back, we realize there were a number of things we could have done differently, and certainly better. I know I could have been more organized and prepared from the start. We could have aborted when number two reported his fuel tank problem, but instead, we left that decision to receiver lead. Quite possibly, what kept this comedy of errors from becoming a tragedy is that the young tanker aircraft commander kept his cool and used his knowledge of aircraft equipment to the maximum to avert the tragedy. We have a wealth of equipment at our disposal, we need to know how to use it to our maximum benefit.

We had a great TDY — Paris, Madrid, London and some great flying too. Our inexperienced crew learned a number of valuable lessons along the way. Maybe you can profit from a few of those listed below or add a few of your own.

Pilots —

- If in doubt, don't take a broken receiver across the pond. Abort now and save a life and a few gray hairs.
- Stay with the aborting aircraft if at all possible.

Copilots —

- Learn to use the INS/DNS. If the DNS head is up front, you can obtain ETA's, present position, distance and time to go, etc. for position reports, all without harassing the nav.
- Doublecheck the nav's waypoint coordinates before takeoff.

Boom Operators —

- Be aggressive in telling the receiver to back out, disconnect, etc. . . . Don't risk having a probe or a nozzle break off over the pond.

Navigators —

- Keep organized at all times — be prepared to become cell lead immediately. (Pilots too!)
- Keep a running ETA and distance to destination, as well as a rough direct heading in mind. Be aware of the distance and general heading to your nearest suitable divert base.
- Keep your destination as an INS/DNS waypoint and the nearest suitable alternate as another one.
- Use charts of sufficient size to give you the overall "big picture" of the mission. Keep strip charts taped together.
- Keep the pilot informed of the weather situation; if it may clear off in 30 NM, tell him, the boom, and the receiver pilot. They may elect to delay air refueling, if possible, until then.
- Be prepared to aid a disabled aircraft, whether it's in your cell or not. You can use your present position as a TACAN station by using UHF/DF bearings and air to air TACAN DME to give you the other aircraft's position. By plotting its position, you can relay its heading and distance to the destination.

— Make sure you add/subtract variation correctly or,

— Plot a north line out of your position and use it as a TACAN station; center your plotter over the station and read bearing and distance on the plotter scales.

— Don't worry if your equipment isn't accurate to 1 NM — a 20 NM error over 800 NM is negligible in an emergency.

1Lt Kevin "Slim" Whitman is a KC-135A tanker navigator stationed at Blytheville AFB, AR. A 1980 graduate of Illinois State University's foreign language masters program, he earned his commission through OTS at Lackland AFB, TX, December 1981, then completed UNT at Mather AFB, CA, August 1982. A Distinguished Graduate from Advanced Navigation at Mather AFB, he completed CCTS at Castle AFB, CA, February 1983.

SAC Tactics School

Training for Combat: A Philosophy

You have all heard the old adage "we train the way we're going to fight" many times. You've probably heard others say even more often that it just isn't so. In fact, you could fill a book with the arguments that surround this issue. Suffice it to say, there are many constraints, some external and some self-imposed, that dictate how realistically we can train for combat. Eliminating or modifying these constraints is, for the most part, a matter that is beyond your ability to solve. However, there is something the individual crew can do to offset the false sense of security that peacetime, training-oriented flying can induce and train as close as possible to the way we're going to fight.

Every crew can adopt a philosophy that analyzes everything they do in terms of combat. It's not as hard as it may sound. First, you can begin by breaking down the inflight responsibilities for each crew position in terms of the differences between the combat and training environments. For example, a B-52 copilot does a considerable amount of talking on the radio during a training sortie, but in combat this might not be the case. There will be no calls to center or PMSV, and there certainly will be no IP inbound calls to bomb plot. So what would he be doing? What could he do to make the crew's job an easier one? For one thing, he would perform a more intense visual lookout than is normal not only for weapons delivery and navigation but also to assist in defensive threat recognition and avoidance. The navigator team reciting their bomb run checklist over the interphone, and drowning out the EW's threat calls in the process, is not a life threatening problem when you're attacking "Gillette" bomb plot. But how well will that work in combat? Instead, try to perform the release configuration check silently sometimes using hand signals between the RN and the navigator to ensure proper sequence and compliance. You may find it effectively cuts down on the crew's own internal "comm-jamming." If these two examples stir some interest, some thought, or some concern, then we're already starting to accomplish our objective.

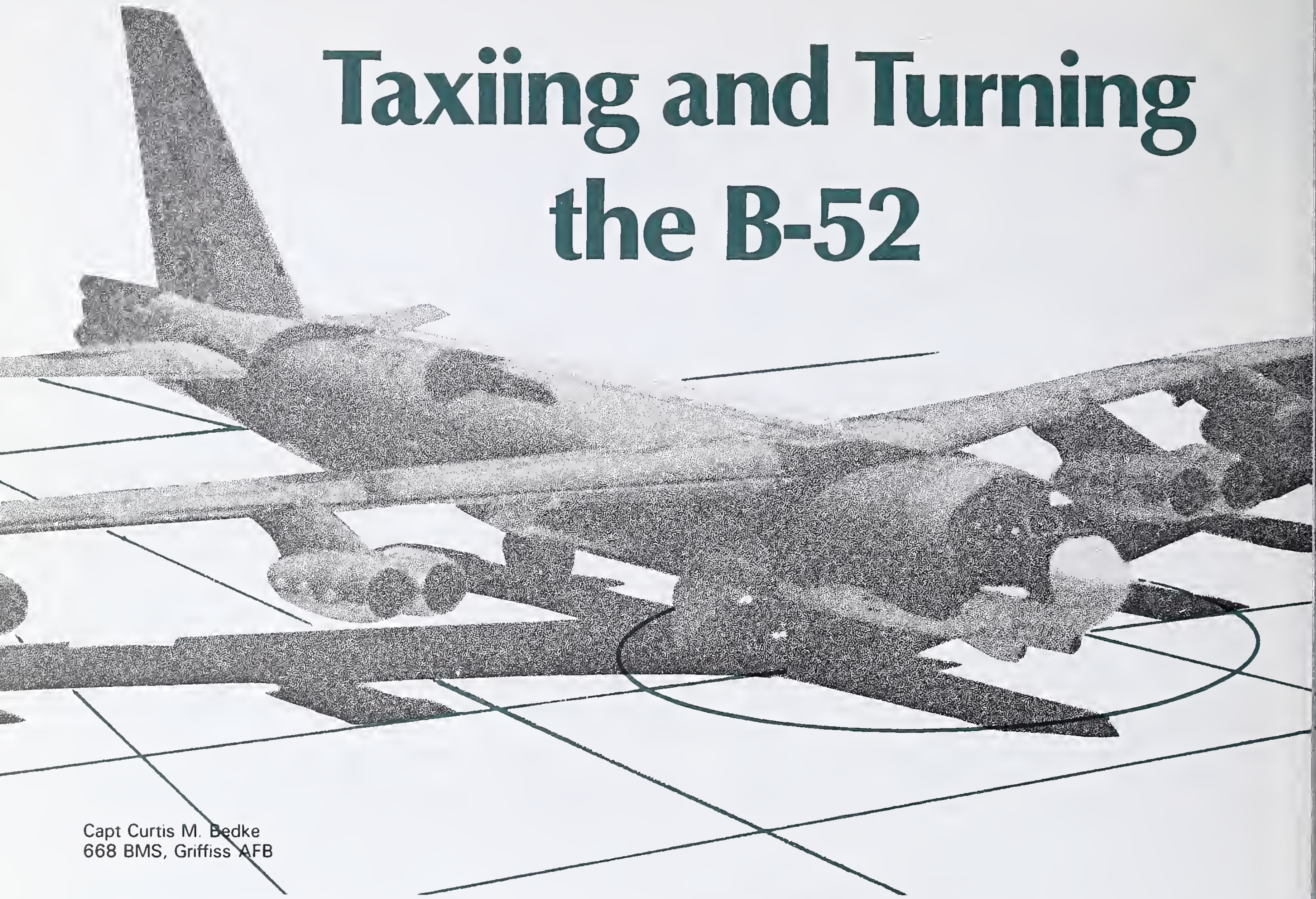
In addition to transposing crew responsibilities to combat, there is more you can do to analyze every sortie from a combat perspective. First, play an extensive "what-if" game when your crew studies a low level training route. Then, talk over every turn point, ridge and target as if your lives and a wartime objective depended on it. In fact, you could even build your own crew scenario for each training mission, to include defenses and types of targets. Then decide on the combinations of terrain masking, speed and electronic countermeasures you feel are necessary to defeat those defenses. Finally, go fly the mission and critique yourselves from a combat oriented viewpoint. Additionally, this approach can improve the safe conduct of every sortie.

For those things that can't be done safely over the friendly confines of Wyoming or Montana, training devices can be the answer. In terms of a crew analyzing what could be termed "combat coordination," the weapon system trainer (WST) is one of the best tools we have. WST time can be used to practice and even experiment with crew combat procedures to ensure these procedures can be safely implemented when needed. Approach this type of training with the kind of open minded attitude that aims to find and highlight the "training-isms" we've all picked up in peacetime flying.

At this point, we should note that this combat training philosophy must extend beyond the crew to the squadron and wing staffs. In fact, they should be the first to foster and encourage the kind of thinking we've advocated thus far. For instance, when a training flight instructor is scheduled on a sortie, he should actively participate in the mission planning scenario process suggested earlier. Then along with the usual checklist compliance and general crew coordination items, he might also observe the crew from a combat performance perspective during the mission. His postflight discussions, in turn, should include combat related items such as crew performance in terrain masking and emissions control. DOXE/INZ and the unit tactics officer should also get into the act. In addition to the normal crew EWO study routine, why not have a crew take a combat mission folder, and one-on-one with DOXE and INZ staffs, intensively "chalk-talk" the sortie from beginning to end to include terrain, defenses and tactical doctrine considerations. These kinds of activities can help produce a warfighting "situational awareness" that may be lacking at present by moving combat tactics from the realm of classroom theory to practical, realistic application.

But don't stop here. If you find a problem in your crew procedures or tactics that you feel is significant and, better yet, if you have a solution — pass it on. Tell your wing tactics officer or tell us at the SAC Tactics School. We, in turn, can analyze the problem and forward it for the proper coordination. In this way, you can even help others to really "train the way we're going to fight."

Taxiing and Turning the B-52



Capt Curtis M. Bedke
668 BMS, Griffiss AFB

How many of the following tricks of the trade have you learned from crusty old aircraft commanders?

- The B-52 always pivots about the rear gear.
- Always start your turn when the cockpit crosses the line you are turning onto.
- By using crosswind crab, you can actually reduce your turn radius.

Most of us have been taught and have used these techniques. Unfortunately all three are wrong.

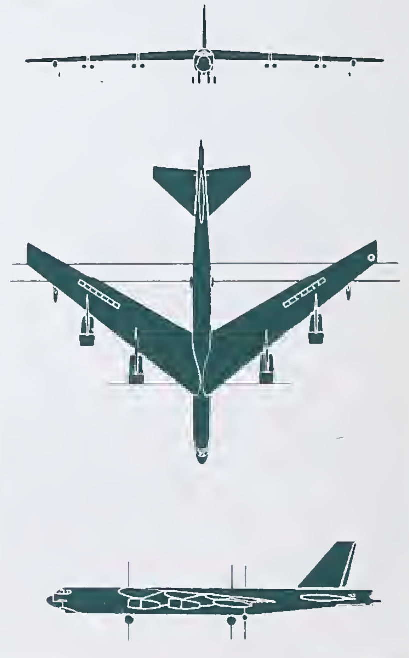
In the past five years, taxiing B-52s have hit almost everything on the flight line but the wing commander's car. Police trucks, construction horses, portable potties and even air show reviewing stands have fallen prey. Maybe we need to ask ourselves some questions: How do we judge turns? Is that wingtip really where we think it is? Is the plane acting like we pretend it is? Well, TLAR works pretty well for us most of the time, but in those tight spots, let's face it — we wish we had a better idea of our capabilities. Remember, one of the two worst things about a taxi accident is that you are way below your ejection minimums. This is unfortunate; bailing out is exactly what you will wish you could do, because the other worst thing is that there is never any excuse for a taxi accident.

Know Your Enemy

So what is there to taxiing other than experience, judgment and a little common sense? Well, let's start out with an easy question. Can you locate all six gear **and** the wing tips of a B-52? Can you do it, though, from the cockpit? Let's take a look at figure 1. For taxi purposes, all these appendages — the two wings and the fuselage — are your enemy. They aren't there to help you. They're waiting to attack something.

- The forward main gear are directly under the wing root leading edge and just in front of the inboard intakes.

Figure 1



- The rear main gear are where? Way back there somewhere isn't good enough. They're abeam the leading edge of the wing where the external fuel tanks stick out.
- The tip gear are about seven feet behind that and only two feet inside the external tanks.
- Finally, there's the wing tip itself. You can't see it from the cockpit, but it sticks out an extra 18 feet past the tip gear.

Now we know where things are based on wing leading edge references that we can see from the cockpit.

Maximum Turn Capability

We were all told as copilots: "The plane rotates around its rear gear." Is this true? Let's look at a picture from the Dash One, section 2, Taxiing (Fig 2). This shows a B-52 in a sharp 55° left turn. See the pivot point? See the direction the wheels are pointing.

The pivot point of anything — your car, your kid's wagon, even your aircraft — is **always** the intersection of the wheel axis lines.

The rear gear always point forward (with crosswind crab set to zero), so the pivot point will always be abeam the rear gear — not the gear themselves, but somewhere along the axis.

As we turn the forward gear (Fig 3), the intersection of its axis with the rear gear moves inward from infinity (the airplane moving straight ahead) in to a point 55° back from the forward gear. Since this is the maximum the forward

Figure 3

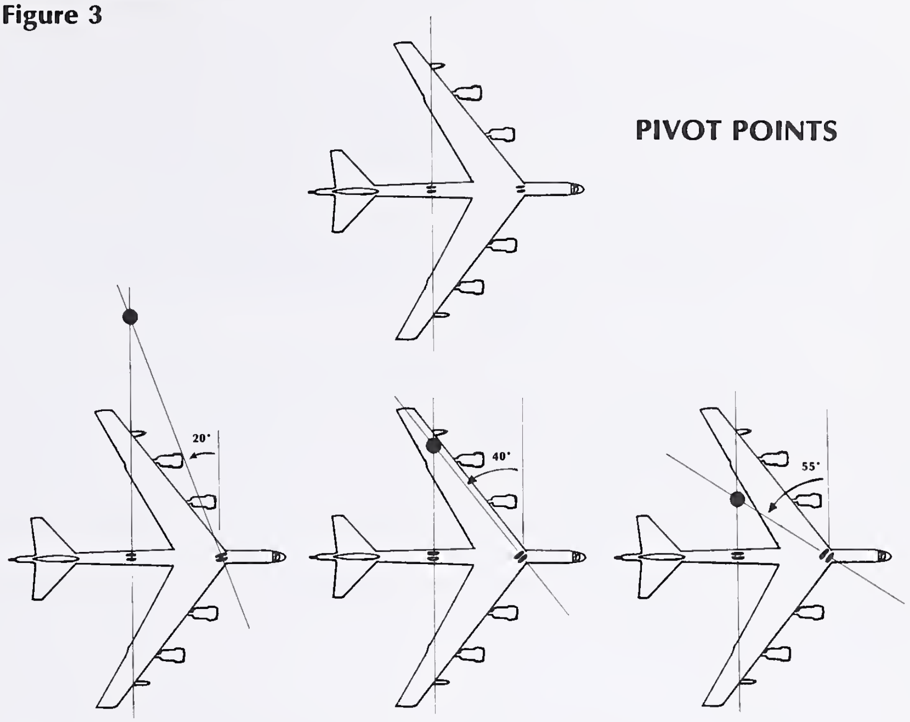
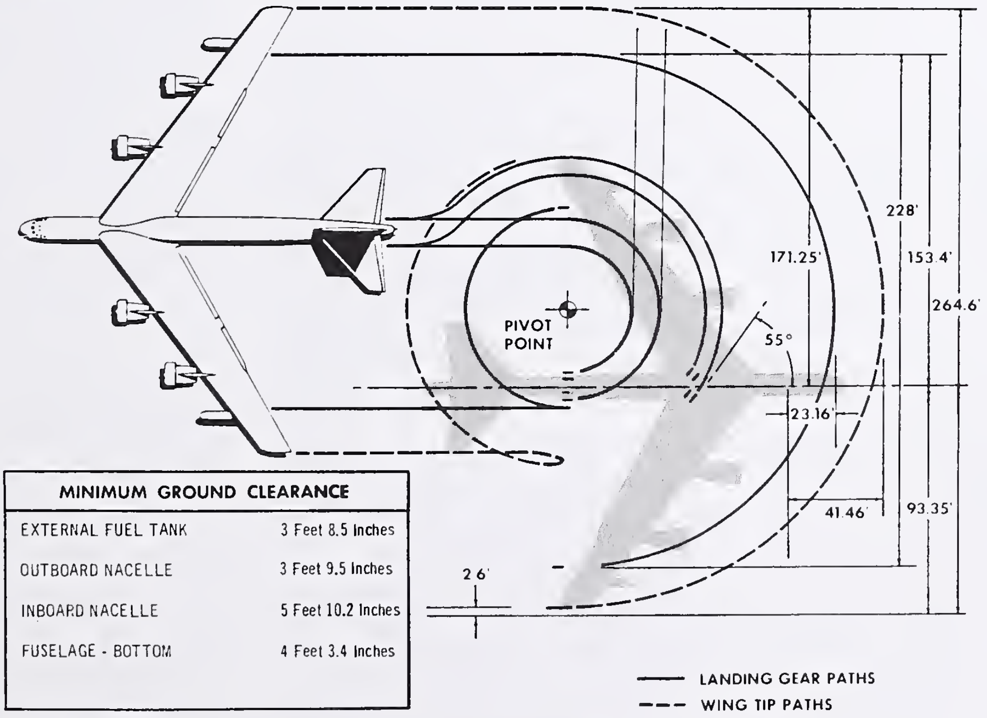


Figure 2

Turning Radius and Ground Clearance



MINIMUM GROUND CLEARANCE	
EXTERNAL FUEL TANK	3 Feet 8.5 Inches
OUTBOARD NACELLE	3 Feet 9.5 Inches
INBOARD NACELLE	5 Feet 10.2 Inches
FUSELAGE - BOTTOM	4 Feet 3.4 Inches

Figure 4

PIVOT POINTS

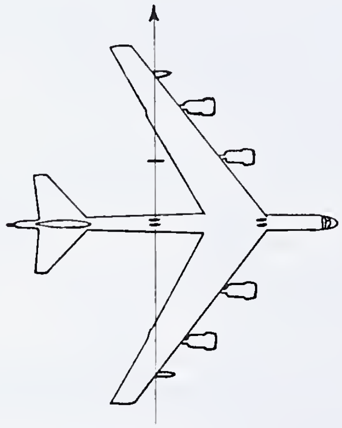


Figure 5

CRAB INTO TURN

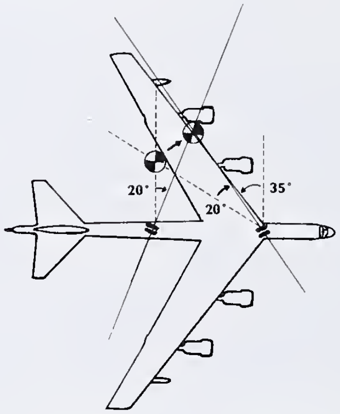
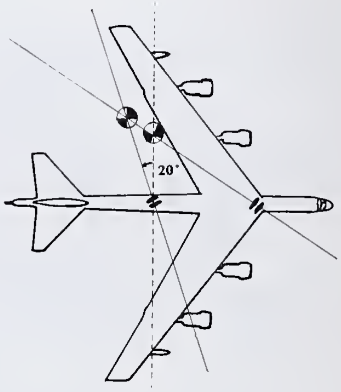


Figure 6

CRAB AWAY FROM TURN



gear will turn, this is our tightest pivot.

Notice that the B-52 cannot pivot around the rear gear — the axis law shows that we would have to turn the front wheels 90° to do that.

What does all this mean to us? It means the plane pivot point will always be somewhere on this line abeam the rear gear (and abeam the wing leading edge where the external tank sticks out), and that we can move the pivot point along that line anywhere from infinity to 55° back (Fig 4). Every point of the aircraft will describe a circle about the pivot point, and by shifting the pivot point's location, we are changing the radius of the turn. Notice that our sharpest 55° turn puts the pivot point directly behind the inboard nacelle.

How To Make A Maximum Turn

Look at Figure 2 again. Assume you're in the plane, pulling out of the chocks, and need to make an abrupt hard left turn onto the taxiway (dashed line), a 90° turn. Look where the rear gear travel. See how far forward they go as they rotate 90° around the pivot point. So, for our sharpest turn, the pivot point is abeam the rear gear directly behind the inboard nacelle. In order for us to get the rear gear to end up right on centerline, we will need to start our turn just as this inboard nacelle's wing leading edge crosses the taxi line or just before the front of the outboard nacelle reaches the line.

Now, just how tight a turn is this? Can the B-52 turn completely around on a 300 foot wide runway? Certainly most of us have done so. How about a 150 foot runway?

We all know the wing span is 185 feet, and tipgear to tipgear is 150 feet. So the B-52 would have to rotate on its rear gear to make 150 feet.

So far we've ignored all those numbers on the right side of Figure 2. We can continue to ignore most of them, but you should remember one: 228 feet; 228 feet is the minimum taxiway **surface** width needed to make a 180° turn at full rudder. The tipgear will roll along both edges in the turn. The wingtip will stick out an extra 18 feet either side, as we said earlier.

Note that if we start out on the centerline of a runway or taxiway, we will need 153.4 feet of hard surface in the direction we are turning. So if you land on centerline, you really only need to come right 3.4 feet in order to make a left 180° turn around on the runway.

Of course, this leaves no margin for error. To play it safe, how far over should we go before turning back? It's tough for that new copilot to judge where the tipgear is, at night, in poor visibility, and there's no sense taking any chances you don't have to.

The safest turn is always with the pivot point of the airplane at the center of your maneuvering area. After all, it's at the center of the area your outside wingtip will cover. So, if you want to make a 180° left turn on the runway, first go right just to where the left inboard nacelle is on the centerline. This will give equally wide margins on both sides of the runway as you make the left turn.

Putting the pivot point in the center of the turn is always the safest bet.

The Effect of Crosswind Crab

For years, instructor pilots have been dazzling us with demonstrations that by putting in crosswind crab in the desired direction of turn (i.e., nose left crab for a left turn), an even sharper turn can be made. Guess what? For all those years, they have been wrong. The turn may look sharper, but in fact it's wider. Here's why.

As crab is introduced (Figure 5), the rear gear turn axis moves forward: up to 20°. However, the maximum turn angle of the forward gear is reduced the same number of degrees, up to 20°. In the farthest case the largest turn angle for the forward gear is only 35°. This results overall in the pivot point moving forward and out.

It only takes a plotter and ruler to measure that this actually increases the main gear turn width from 96 feet without crab to 107 feet with full crab. And the tipgear radius increases just as dramatically, going from 110 feet to 123 feet. Notice that the radius from the pivot point to the cockpit actually decreases making it look like the turn is sharper and tighter but overall, you'd need a bigger area to turn around.

As a matter of interest, when crab is put in the other way, opposite the direction of turn, the maximum turn angle remains 55°. The pivot point goes back and out — again making the turn wider (see Figure 6).

In both cases, adding crab will also cause the plane to travel further in its original forward direction than if crab is not used. Thus, crab will not help you if you have nosed too far forward into a parking stub, for example.

The sharpest turn is achieved when crosswind crab is centered.

Crosswind Crab Can Help When . . .

There are only two times you will need crosswind crab for steering purposes — both are covered in the Dash-1. The first is to correct a "TPG Not In Trail" problem. The trick is to put in the crab in the direction **opposite** the turn you just made, as quickly and in as short a distance as you can. If necessary, then steer back into the turn. Once the tipgear is righted, return to centerline and zero out the crab.

The second case is for a section 3 emergency, "Complete Steering Failure." Crab must be centered on landing. Once on the ground, use the knob like a little steering wheel — just a very little at a time. Remember, now your front main gear will remain straight ahead, so your pivot point is now abeam them. Also, your maximum crab is 20°, so your sharpest turn radius will be about 146 feet (radius of circle made by the forward gear). Don't delay any turns. Keep the forward gear on the taxi line. Most likely, other then using the crab to maintain runway centerline, you'll only need to turn when clearing the active runway.

Those Sneaky Limitations

How well do you know the taxi speed limitations? Maybe not as well as you think you do. Let's examine them.

We all remember that the maximum ground turning speeds with full rudder travel are five knots in TAXI or 27 knots in TAKEOFF LAND. At gross weights above 450,000 pounds, we are further restricted to 15 knots for turns not exceeding 20° of steering, and five knots for turns of more than 20°. And finally, the maximum turn-on ground speed for a 140 to 150 foot turn radius is 15 knots.

But reciting these limits for a stan/eval test and using them are two different things. What does 20° of steering mean to you? How can you tell what steering angle you have? The answer is hidden right under our noses. Use the crosswind crab indicator. The bottom needle shows forward gear position, and it points in the direction opposite the way you are turning. The calibrations go up to 20°. So it's easy to use this to monitor your turn.

The other big secret is the 140 to 150 foot turn radius. It sounds great, but are you supposed to park the plane and go out and measure out the distance? Fortunately, the answer is quite simple. We already found under the "Complete Steering Failure" discussion that 20° of rear crab will give a 146 foot turn radius. The same geometry applies if the forward gear are turned instead. So, the 140 to 150 foot turn radius is just a 20° turn.

ABOUT THE AUTHOR

Captain Curtis M. Bedke (USAFA; M.S., Stanford University; SOS/ACSC) is a standardization/evaluation instructor pilot at Griffiss AFB. Previous duties include B-52 aircraft commander and training flight instructor pilot. His interest in taxiing the B-52, he says, skyrocketed immediately after he "experienced" a taxi accident as a copilot at March AFB.

But T-37's Do It All Day . . .

Capt Charles H. Thomas, Jr.
4017 CCTS, Castle AFB

Fly with an unpressurized cockpit, that is. As a B-52 crew member, I'd heard this line almost as many times as the infamous, "It can't happen to me." I think it's time to refresh your memory on the difference between "all day" in a T-37 and a B-52 or KC-135.

Our day began with the typical early morning show at base operations. The flight was primarily an instructor sortie, although we did have two student pilots along for the air refueling.

After the weather briefing, we proceeded to life support for helmet pickup. I remember the "good old days," when we were allowed to keep our helmets comfortably and securely stored in the trunks of our cars. This was quite advantageous in many respects: you always knew the cracker crumbs in the mask were your own; your mask didn't always smell like an alcohol swab; you didn't have to go by the helmet shop on the way to the plane; and you didn't have to do that oxygen check on your mask with five guys standing in line behind you.

So there I was, at the head of the line, putting on my helmet for the mask check. It was then that I remembered the most important benefit of the old car trunk method — nobody ever "adjusted" your helmet for you unless you asked them to. Now I discovered that the helmet shop had added padding behind my earphones and had tightened the small strap at the back of the neck. The result of these professional adjustments to my form-fit helmet was a feeling closely akin to some sadistically inspired vise clamp.

I must admit the thought did cross my mind that perhaps I should mention this minor discomfort. Fortunately, common sense made me realize what an absurd idea this was. We were in a hurry to get to the plane for our preflight, and there were five other guys standing there waiting their turn. Besides, I only had to suffer during takeoff, air refueling, low level, and in the pattern. I could surely handle these minor intrusions to the comfortable fit of my headset during the rest of the mission.

The mission was scheduled for air refueling an hour after takeoff, followed by a leisurely cruise over to IR-276 for low level training. Downstairs we had two 4017th CCTS IRN's, myself in the radar seat and a fellow instructor in the right seat. I was instructing him on his second flight in the new OAS inertial navigation system. The IP was a highly qualified flight line instructor.

Everything went well during preflight and takeoff. Our problems began at the 12,000 foot oxygen check. The cabin failed to pressurize; I immediately panicked. Not because we couldn't pressurize, but because this meant that I might not be able to light up a cigarette for quite some time. Only you smokers can truly appreciate the seriousness of this aspect of unpressurized flight. Meanwhile, the pilot requested a leveloff at FL 180 and we began to work the problem.

All attempts at reconfiguring or recycling the air conditioning system failed. The pilot asked us to check the bulkhead door for leaks. The nav cleared off to check the door and then crawled forward of our seats to check the air-conditioning valves in the "wine cellar." Again, no success.

We then contacted the command post, received a phone patch to maintenance, and explained our problem. They were unable to give us any additional ideas on solving the problem. Now came the decision time. Should we press on to AR at a lower altitude, or burn down to pattern weight and accomplish practice landings? You could almost hear the phrase, "But T-37's do it all day!" I'm sure everyone was thinking it.

We discussed the various options available to us and decided to refuel at FL 240 if we could get clearance from ARTCC and scheduling. Both agencies cleared us onto the track at the lower altitude. As we proceeded towards the ARIP, I noticed that my ears had become numb from the tight fit of my helmet. It wasn't much longer before the headache started from the back of my neck. Well, I'll say one thing about my custom-fit helmet, I sure didn't have to worry about a leaky seal around the face mask! Yes sir, I could feel the grooves forming on my face and I was sure they would take days to disappear after the mask finally came off.

Another nice aspect of refueling without a pressurized cabin is having to turn off unnecessary electrical equipment. We began to do this as soon as the tanker rolled out in front of us. This left us with all our equipment shut down, and nothing to do during refueling except think about how dry 100% oxygen can make your throat feel. Soon, however, the nav broke the boredom by asking me to go to private interphone. Once there, he began to complain of a pain in his left knee.

This sounded faintly familiar. In fact, it had been less than a month since my altitude chamber refresher training. We discussed the typical symptoms of hypoxia and the dreaded "bends." The nav wasn't sure if he had simply bumped his knee while crawling around in the wine cellar area. We agreed to watch closely for any further symptoms. By now we had been at altitude for about two hours.

Twenty minutes passed before the pain in his knee became worse. In addition, he was now experiencing discomfort in his left hip and stomach. We notified the IP at this point. He immediately terminated refueling and got us cleared to 13,000 feet (mountainous terrain prevented a lower descent). We had been at altitude for two and a half hours by now.

Fortunately, the nav's symptoms disappeared during the descent. We returned to the local area and contacted the command post. The flight surgeon directed us to keep the nav on 100% oxygen, while we burned down to landing weight.

After landing, the flight surgeon met us with an ambulance. The nav managed to weasel his way out of helping to unload the plane, and was taken directly to the hospital. He was treated by what seemed like the entire staff of the flight surgeon's office. He lost count of the number of oxygen bottles he depleted. One arm had an IV going in, while the other arm was giving vast quantities of blood to be rushed to the lab. After examining the nav and his test results, the flight surgeon determined that hospitalization was not required. The nav was released after about four hours.

Cont'd on page 26

N-O-M-
PROT

Jim

NOMEX is a trade name for the material developed by Du Pont used in the manufacture of protective clothing for air crews. The fabric is made from high temperature-resistant aromatic polyamide fibers with the generic name of ARAMID. The correct designation is NOMEX ARAMID fiber. The fire resistant qualities of the fabric are not derived from a treatment applied to the cloth, but rather are the result of the molecular structure of the material itself that prevents it from melting.

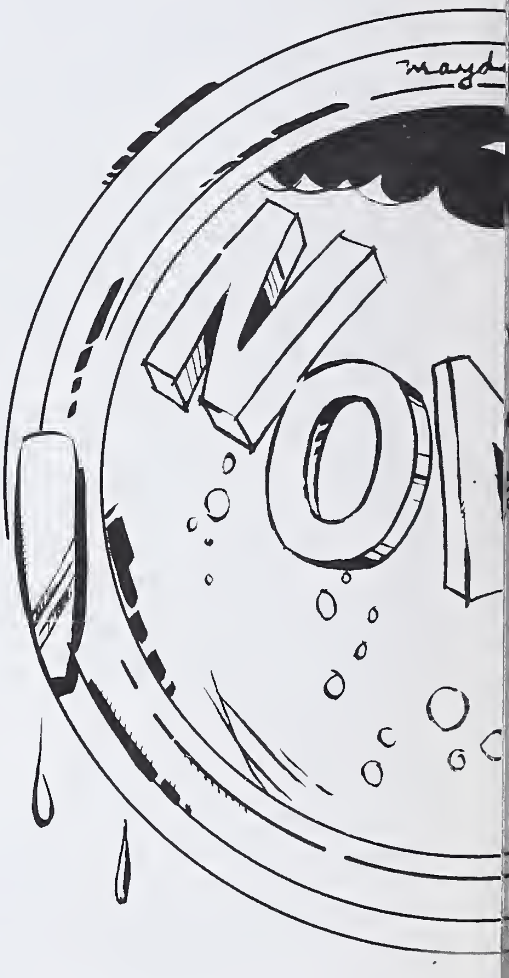
The early Nomex fabrics were made from continuous filament fibers — unending fibers which were woven into fabric used for anti-G suits, and other applications where strength, in addition to fire resistance, was an all important factor. Such fabric, however, lacked the qualities needed for a soft and comfortable material to be used in garments worn every day.

The continuous filament was replaced by short fibers which were chopped up and made into yarn in a process much the same as that employed on an old fashioned spinning wheel. The material made from the resultant Nomex threads is not only highly resistant to fire and heat, but is resilient, lightweight and comfortable to wear. It also retains the required strength. The standard items of apparel made from this fabric are flight coveralls, jackets, shirts, trousers and gloves.

This flight gear should be reserved for actual flight operations and never worn for general maintenance activities. Grease, oil, petroleum fuels and other dirt and grime will degrade the fire resistant properties in the contaminated areas. Maximum protection requires that the sleeves be worn down, the cuffs fastened and the bottoms of trouser legs fastened and shirt tucked into trousers. Never wear synthetic underwear with Nomex. Synthetic underwear melts. Who wants a batch of melted underwear hung around his equator? Changing to clean underwear before each flight is also strongly recommended. In the event of an accident involving burns, soiled clothes can produce infection.

CARE, of the "tender, loving" variety, is the magic ingredient that will ensure maximum protection from your Nomex garments. The No. 1 preventive maintenance action for your Nomex clothing is to keep it clean. There is nothing magical about the cleaning process. Nomex can be dry cleaned, hand washed or run through the home automatic or a commercial type unit. To obtain the best results, follow these simple instructions:

- Turn all pockets inside out; brush away dirt, gunk, bits of paper, threads and any other assorted trash. (Retrieve any paper money for future use.)
- Close all zippers and hook and pile (Velcro) fasteners.
- Use a water temperature of medium hot to hot (to a maximum of 180 degrees Fahrenheit).
- Add enough powder detergent to make plenty of suds.
- Use a commercial fabric softener. Stop the machine and add it before the last rinse cycle starts.
- Wash at least five minutes; rinse four to five minutes; spin dry one to two minutes. Tumble dry, or hang in shade to drip dry. (Dryer temperature should not exceed 180 degrees Fahrenheit.)
- Launder your Nomex as soon as possible after a fuel spill.



-X Spells CTION

rk

• NEVER use starch — it will BURN! And there go the fire resistant properties. If some laundry type adds starch in the washing cycle, don't panic. Just run the Nomex through the rinse cycle a couple of times, dry it and wear it with confidence.

• You can touch up Nomex with an iron, but never iron the hook and pile (Velcro) fasteners.

Some special tips apply to Nomex gloves. You can wash and rinse them like you do with other Nomex clothing. Or you can put them on and wash them with soap and water as if you are washing your hands. But never wring them out by twisting them and never dry them in a dryer or with any other heat source, including direct sunlight. Instead, squeeze the water out of them, lay them flat on a clean towel and roll them up in the towel, making sure the two gloves aren't touching. Leave them in the towel for an hour or so and then air them out in a cool, dry place. They will have to be stretched back into shape the first time you put them back on.

Never wear Nomex gloves when working around equipment where they can be soiled with grease and oil. They're supposed to be worn only when operating aircraft. You may need a softening agent for the leather palms. Use Neat's foot oil or saddle soap. Don't be perturbed if the oil turns the leather darker.

Use of a fabric softener as recommended above is for a more subtle purpose than to make them soft and comfortable. The softener acts as a fabric lubricant and moisture retention agent. It won't destroy the fabric's fire resistance. You'll notice that the amount of static electricity is reduced too. This is most important, and here's why:

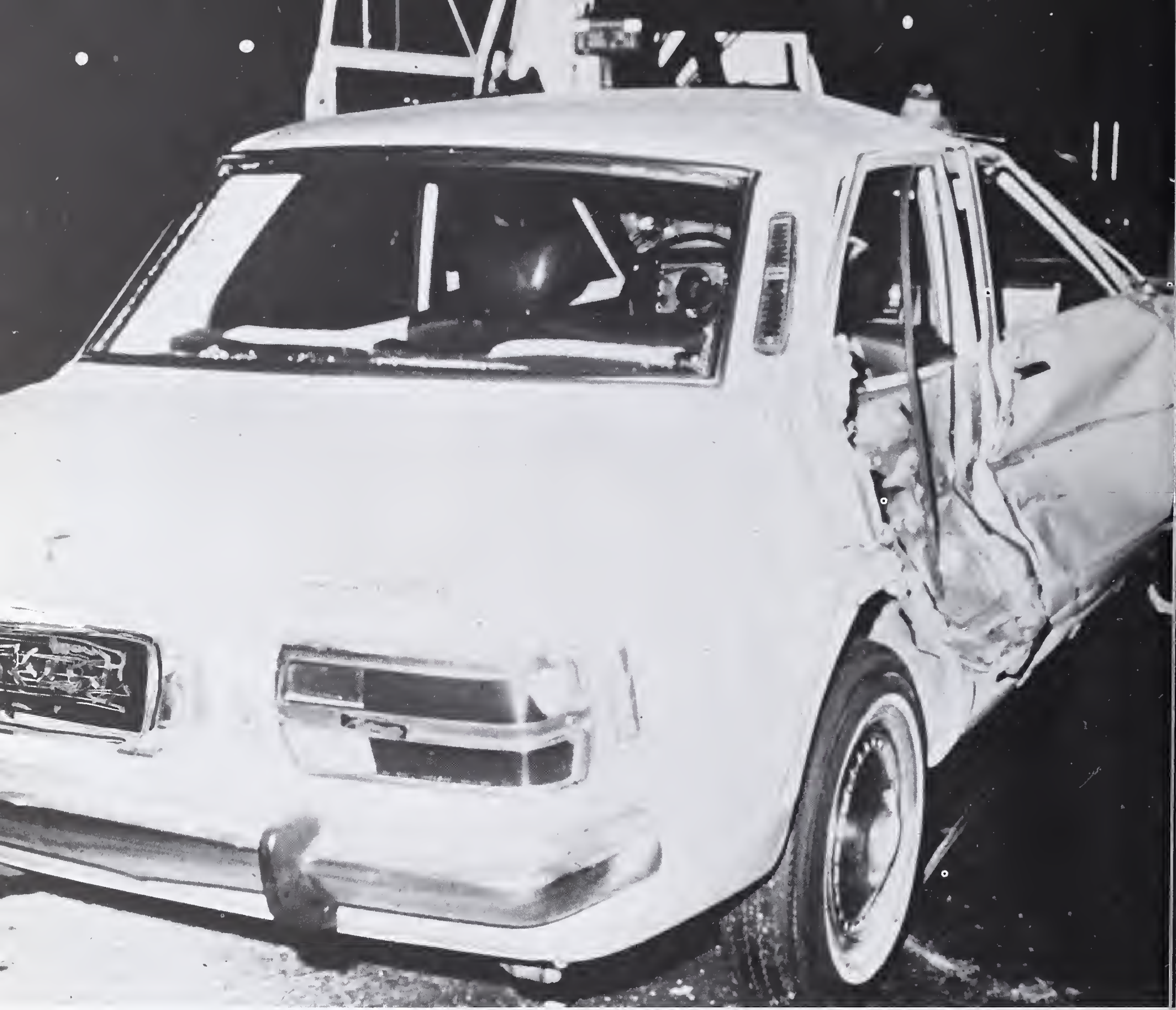
Natural fabrics like cotton and wool generate static electricity when they rub against synthetic materials such as polyester or Nomex. Your body is a natural conductor and can hold these charges up to several thousands volts. Most of this is drained away through your shoes into the floor. But as we all know, it can often cause sparks when you come in contact with another person or a metal object, or remove a piece of clothing. This is usually only annoying, but it can be dangerous if you are around highly flammable materials.

For instance, when you take off Nomex clothing that is fuel soaked, your movements could cause a static electricity discharge that could set the clothing on fire. If you do spill fuel on your Nomex clothing, move slowly away from the area. Get at least 50 feet clear of any fueling operation. Hose down your clothing before taking them off. If you can't soak your clothes with water, grab hold of some grounded, bare metal with both hands. Hold on to it for a few seconds. This will equalize the electricity between you and the grounded object. Remove your clothes slowly and carefully.

A little skin irritation from the fuel won't kill you; the fire following a static discharge could!

Final Admonition — Take care of your Nomex, and it'll take care of you!

Thanks to **Northrcp's *F-5* Technical Digest.** *Mr. Clark is a retired senior technical specialist with Northrop's Product Support Division.*



Seatbelts = SURVIVORS

Sgt Joan M. Long
101 AREFW, Bangor ANG, Maine

I suppose I'm a little more safety conscious than most folks. After all, I handle all the documentation that goes into our files; and I've read a lot of accident reports in the past few years.

Seat belt safety is a special concern with me. Sure, accidents happen every day. People get hurt because they won't wear seat belts, and it makes me angry because a lot of suffering and expense can be avoided by buckling up; the statistics prove it.

Still, when I talk with people about seat belts, it seems like they always know of someone who would have been killed if they had been wearing a seat belt. Sometimes that's true, but it's the exception to the rule. Today I know of someone who is not the exception.

On Dec. 21, 1984, a young lady named Sharon left work at 3:00 p.m. — happy because she didn't have to go back to work until after Christmas. She went to a nearby bar to celebrate with a few co-workers.

At 7:00 p.m., she left to drive to her mother's house, but never arrived.

Half-way there, she lost control of her car and crashed into a utility pole at high speed.

Sharon broke her neck, every rib, and severed her spine. She lost a lung; the other one was punctured. The surgeons removed her spleen as well as a blood clot in her brain. Her left shoulder was disintegrated.

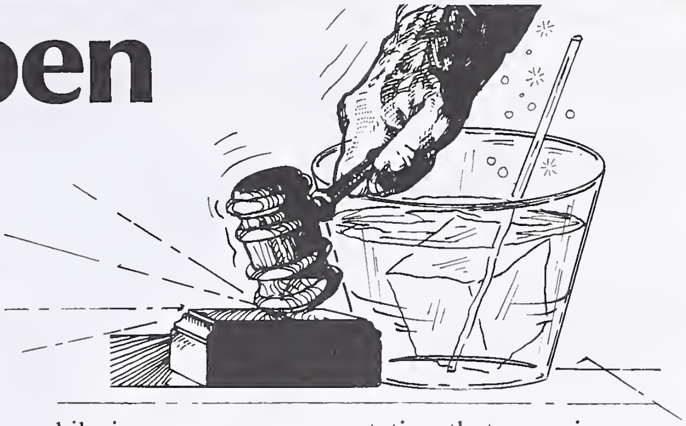
I saw the car after the accident. The imprint of the utility pole was very evident, but it's on the passenger side of the car in the rear seat. The driver's compartment was intact. If Sharon had worn her seat belt, she might have been injured, but not to the extent that she was.

I didn't know Sharon very well, but I grieve for her and her family. They'll share the pain and suffering for a long, long time.

I wear my seat belt every time I get into a car. It isn't such a hard habit to get into. If you won't do it for yourself, won't you wear your seat belt for your loved ones? Please? — Thanks to **Bangor ANG Mainiac.**

It Could Happen to You

A1C Charles W. Brown
2155 ISS, McConnell AFB



I was having a great, fun-filled evening with my wife and friends. There was music and laughter in the air. Not a worry in the world to cast a shadow on me. As I was driving home from the club, the picture changed rapidly as I saw flashing lights in the rearview mirror.

Before I knew it, I was walking a painted line, touching my nose and trying my best to prove to the law officer that I hadn't had too many drinks. Not much later, I was downtown — getting my picture taken. I was searched and placed in a cool, damp cell. When the door shut, it sounded as loud as thunder.

Never had I felt so humiliated! I just could not believe it! Being placed under arrest for driving under the influence only happened to "the other guy," not me. My worries and troubles had just begun.

The next morning I awoke to the sound of keys and a voice saying, "Mr. Brown, there's someone here to see you and take you home. You will be released soon." What a relief it was to finally get out of jail. As the cell door opened, my eyes opened wider than the door. My First Sergeant stood on the other side of the jail guard. Not only was I in trouble with the civilian authorities, now the military also was involved.

I can't drive on McConnell for one year. As I walk to work in freezing temperatures, snow and ice, my toes and feet beg for mercy with every step. So the next time you see me walking, think about me. I'm the "other guy." Most of all, think about yourself.

I was a first-time DUI offender and received the minimum penalty. I lost my driver's license. When that happens, you automatically receive a notice from your automobile insurance company stating that your insurance has been canceled or that you must pay higher premiums. My attorney's fee was $500. On top of that there were fines totaling more than $500, and a two-year probation.

Along with all this, I must attend the alcohol diversion program, but that's better than going to jail. Not everyone is allowed into the program. If you should go to jail, your military pay stops completely from the time you enter until you are released. The Air Force also can punish you with a fine or demotion. It can withhold promotions and possibly discharge you.

And when I fill out job applications in the future, there will be several familiar questions: "Have you ever been arrested, charged, or convicted of a crime? Has your driver's license ever been suspended or revoked? If so, explain."

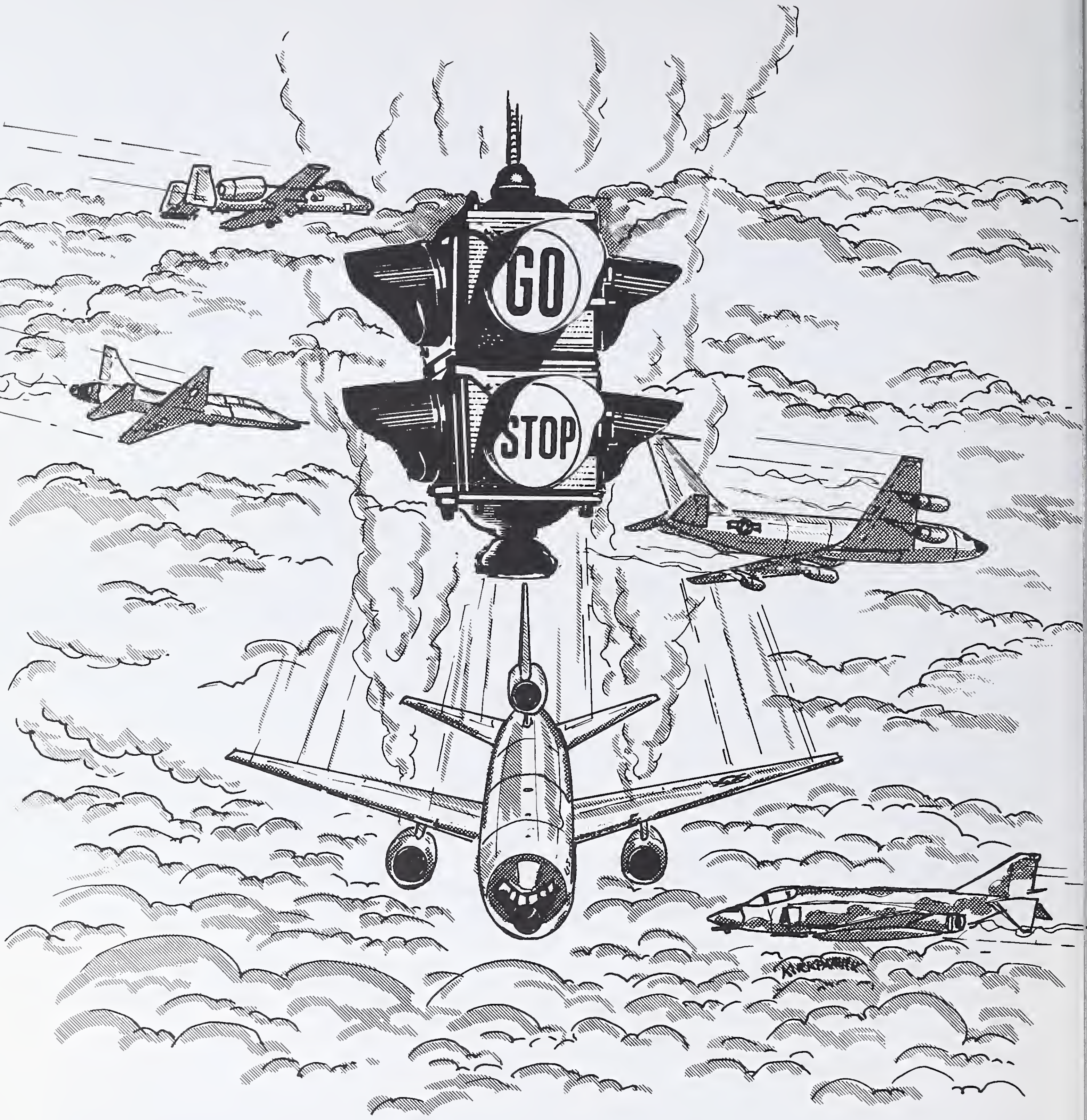
As I mentioned before, I was a first-time offender and it cost me more than $1,000 plus my driver's license, military disciplinary action, two years probation and a permanent police record.

All this sounds pretty harsh for first time offenders, but it could have been worse. I might have been in a wreck and injured myself or killed someone.

Take a look at your family, loved ones, co-workers and friends. I'm the "other guy" — the one who could have taken them away forever.

As easily as it happened to me, it could happen to you. — Thanks to **McConnell AFB Contrails**

**"Make A Vow In '86 —
Alcohol And Driving Don't Mix."**



CROSS SIF CHECK

Traffic Safety

SIFC Crosscheck
SIFC, Castle AFB

"Echo 25, traffic 12 o'clock, five miles, opposite direction, altitude unknown."

We've all been there before; reported traffic headed our way, no visual contact, and a growing sense of foreboding as the distance calls decrease. How a crew handles this situation depends on how well they understand the service being offered by the radar controller, and, of course, whether or not they see the reported traffic. This article is intended as a refresher on the applicability and capability of this ATC function, and how we can best use it to enhance our own safety. We will limit the discussion to VMC conditions, because when conditions are IMC you should not have conflicts with VFR aircraft. If VFR aircraft are operating in IMC conditions, then more than enough rules are already being broken to make your day unsafe.

First of all, traffic advisories are an **additional** duty for the radar controller. In other words, it's not a required duty. It's not meant to be optional, it will be provided if the controller is able to do so. Hopefully, no one is surprised to read this. One of the guiding principals we fly under is (and always has been) that it's the pilot's (or more appropriately, the crew's) responsibility to see and avoid other traffic while in VMC conditions, regardless of the type flight plan filed (FAR's Part 91; AIM paragraph 407; AFR 60-16 paragraph 5-2). So, the controller might **not** call out conflicting traffic to you. The traffic might not be considered a factor, the controller might not see it, or he might be busy with other required duties and simply not have time. That's why instructors continually remind crews to **clear outside the cockpit.**

Let's break down the controller's traffic call: "Traffic 12 o'clock" — That's clock position relative to your aircraft, right? It depends. Remember that the controller isn't correcting for wind drift, he can't. All his radar display is capable of showing is the ground track of your aircraft. He has no idea about your heading through the airmass. If your aircraft is holding 10-15° of crab for instance, your 12 o'clock traffic might actually be spotted at 10:30 or 1:30. Controllers are human too, you might not be the first crew to spot the traffic over at the "other" three o'clock. **Therefore, don't stagnate your clearing effort in only one sector.**

"Five miles, opposite direction" — The range and direction of travel are estimated by the controller. If you do spot traffic in the vicinity of the controller's call, **use this information to verify that you see the traffic that the controller is worried about.** Remember that there might be more than one target out there, and it behooves the crew not to fixate on one target only to conflict with the "real" traffic.

"Echo 25, traffic 12 o'clock, five miles, opposite direction, altitude unknown."

"Altitude" — This information is dependent on the equipment in the target aircraft. If the controller says "altitude unknown" it means that the target has no altitude encoding equipment (mode C) capability (or if it does, it's not turned on). If the controller says "altitude 2500 feet unverified" it means that mode C readout is available and shows 2500 feet. However, since the controller isn't in radio contact with the target aircraft, he's not sure that the information shown on his scope is correct. He's giving it to you anyway because it might be useful to you in locating the target. If the controller tells you the target's altitude, it means that he's in contact with the VFR aircraft. That's not often the case, but could occur if the VFR aircraft is participating in a Basic, Stage II, or Stage III Terminal Radar Program. Some of the Terminal Radar Programs are now being replaced with the new Airport Radar Service Areas (ARSA's). Participation by VFR pilots inside ARSA airspace is mandatory and should go a long way towards preventing traffic conflicts.

Now that the controller has provided the service, your job begins. If you see the traffic, great! Monitor the threat, and take action to avoid it if it becomes necessary. The scary part happens when you **don't** see the traffic. When that happens, **get the rest of the crew involved.** The more eyes the better. Don't wait too long however, before asking for avoidance vectors. If you don't already know, the controller's hands are tied unless you ask for his help. So get the controller involved too. The earlier you ask, the better, because it gives the controller more time to effect separation. The earlier you indicate your willingness to accept a vector, the smaller the heading change needs to be to achieve separation. If you wait too long, you might be sealing your own fate. When the threat merges too close to your radar return, the controller may have no choice but to say "unable to provide vectors." That's because he's no longer able to have you react quickly enough, or provide a heading change large enough, to stop the two radar targets from merging. If he can't be sure that his vector won't make a marginal situation even worse, he can't help you. If you've waited that long, you're betting that the "big sky" theory works.

To recap:

- Clear all the time.
- When traffic is called, don't stagnate your clearing efforts in only one sector.
- Verify the target with the controller's information if you see it.
- If you don't see the target, involve your crew.
- Involve the controller too, by asking early for avoidance vectors.

Until next month, fly safely — and may all your traffic be six o'clock, opposite direction.

THE CUTTING EDGE

Missileer's Model . . .

for action prioritization

Capt Jon A. Eller
Vandenberg AFB

In the quiet hours before dawn, Lt Zilesky is working intently at the commander's console 60 feet below the frigid Missouri landscape. He is only vaguely aware of the miserable weather topside as another winter storm sweeps in from the north, laying a glistening white blanket of new powder. As he takes the weather advisory report, thoughts of a "delayed changeover" and "when do I wake my commander" fleetingly cross his mind and then vanish as the morning rush begins.

At 0900, a maintenance team arrives at his launch facility 10. The team chief takes the combination to open the site and coordinates his activities with Zilesky. The team will be on site for five hours and later in the morning they will remove power to the site and take the launch facility down.

At 1000, the team chief calls the capsule to say "sir, we will be removing power now and the sortie will report LF down." Zilesky gives the OK and quickly coordinates with the other four capsules so they will be prepared to run status out emergency procedures when the sortie goes down at 1005. At 1002, the flight security controller calls from his topside office, "Sir, teams have arrived at launch facilities two and five and are requesting entry." Zilesky temporarily puts the teams on hold to be ready for the status change at LF 10.

At 1004, the primary alerting system warble tone sounds announcing an emergency action message. Simultaneously, the capsule experiences a loss of primary power. As the weapon system printer spits out a ten minute holdoff warning, Zilesky issues an exclamation, "how could all this be happening at the same time and why is it happening to me?" As he pauses to ponder what to do next, ALARM Number 1, environmental control system alarm, and primarily alerting system harmonize with a sour note only a missile crew member could appreciate. Zilesky wonders why they put all these darned buttons so far apart. Surely if the designer were watching now he would have a diabolical smile on his face.

The situation presented is not too farfetched. If you have been on a missile crew, you probably have been in similar situations and understand what Zilesky is experiencing. You may even chuckle at the young lieutenant's predicament and are thinking about what he would do next. The point is — what would you do in the same situation? Stop and think about the alternatives. Would you wake your partner? It would take at least one minute for him to be functional and you have no time to waste. Would you prioritize your actions through the LESFO model or do you think it is only for emergency war order (EWO) scenarios?

LESFO is a priority list and stands for Life, EWO, Security, Faults, and Other. "Life" means the life of your equipment and/or the life of the crew. Life is your number one priority at all times because if the crew or the equipment perish, the mission cannot be fulfilled. One of the most important aspects of LESFO is that it places safety as its highest priority. Crew members often do not realize that the driving force behind emergency technical order procedures are either weapon system safety rules (AFR 122-23) or just general safety precautions. Status out procedures, anti-jam, and inhibit test are designed to ensure compliance with weapon system safety rules. Fires, power, air, and manual hardening procedures are designed to ensure compliance with personnel safety requirements and to protect equipment. Since these emergency procedures deal with safety of personnel or equipment, they logically fall into the life component of the model, but if you only use LESFO for EWO scenarios this may not be apparent to you. "EWO" means any actions directed by an emergency action message procedure. When you come to the EWO portion of the model you should ask "do we have a commit coming up?" If so, make sure you meet that objective because proper commit of executed sorties is your next highest primary objective. If no commit is pending then at the EWO step, make sure any other EWO actions are accomplished. "Security" means any security actions which are required in accordance with SACR 207-16. "Faults" means any fault procedures in your technical order. "Other" means anything else you left hanging such as log entries, clock hacks, update forms, etc.

Now you know what the parts of the LESFO model are. Commit them to memory and the next time you think you are "up the creek" jot it down on the console and go for it. You may be pleasantly surprised by how quickly things fall into place. Remember — it's not just for EWO.

Let's apply the model to Lt Zilesky's predicament and see if it would work for him. At 1004 he thought he would go crazy but then he remembered LESFO. Jotting it down on the console, Zilesky wisely yelled for his commander to get up. With renewed confidence he attacked "Life" and proceeded to his power and air technical order procedures. Just as he found the badly bent technical order tab, the emergency air conditioning unit came up and, checking air from the equipment racks, he found it cool and adequate. With the safety of his equipment assured he put his technical order on hold temporarily and went to block two of the model. A sigh of relief swelled from his throat as a hard copy of the transmission spilled from the SAC Automated Communications and Control System Printer. He quickly decoded it and thankful he had no action on the message, he passed a copy to his commander for verification as number 10 dropped status out. Realizing again that he ought to re-tab his technical order, he struggled to his emergency procedure for status out launch facilities. Making a mental note that he was not sure if this was "Faults" or "Life," he quickly confirmed the hardware status of LF 10. Checking air from his racks he again glanced at his console. Life, EWO, Security were all covered. "Faults" next, so Zilesky cleaned up status out in section five of his technical order and scanned his printer. Goose pimples raced down each arm as he saw the forgotten holdoff warning and thoughts of RADIO MODE and civilian employment raced through his head. A quick conference call on the hardened voice network cleared up that problem as the squadron command post volunteered to put in the command.

Cont'd on page 26

PROFESSIONAL PERFORMERS

Missile Maintenance

SSgt Dale A. Warren, 308 SMW, Little Rock AFB, is SAC's ICBM Maintenance Airman of the Month. Assigned to the propellant servicing (PTS) branch, Sgt Warren continually demonstrates his knowledge and technical expertise in propellant servicing through innovative procedures and hardware development. He developed a booster system for compressed oxygen bottles used to fill the Bio Pak 45 self-contained breathing apparatus. This system maximizes the use of the Bio Pak 45 bottles. Sgt Warren helped develop and test a prototype ejector extension to reduce freezing up of the environmental control unit worn underneath the rocket fuel handlers clothing outfit (RFHCO). Also, he recently implemented new inspection procedures for the RFHCO, suggested new cleaning procedures for the Bio Pak 45, and developed new procedures for removing and replacing the communication harness assembly of the fuel handlers helmet, significantly reducing turnaround time. Sgt Warren is a model NCO, setting a rapid pace for all to follow. He is highly deserving of this award and is regarded as one of SAC's finest.

Munitions Maintenance

SrA Brett C. Maki, 42 BMW, Loring AFB, is SAC's Munitions Airman of the Month. Assigned to the loading standardization section, SrA Maki possesses an impressive string of outstanding achievements that have directly contributed to the SAC mission. He holds a perfect record of task and evaluator evaluations by quality assurance and higher headquarter inspection teams for the last three years. In August 1985, his daily hard work earned an "excellent" rating by the SAC IG with the report stating, "this standardization section is the best seen in the last 12 months." During the 1985 SAC ORI, SrA Maki was tasked to load an AGM-69A single missile on a rotary launcher for a technical evaluation for the IG inspector. Overcoming numerous problems, weather delays and equipment malfunctions, SrA Maki performed the task with no errors and below command established time standards. SrA Maki was selected to represent the 42 BMW in the 1984 SAC Combat Weapons Loading Competition. He was also on the crew which performed all loads during Short Trip 47, a highly visible USAF-USN stores clearance and aerial mine certification program for the B-52G aircraft. He received letters of appreciation from the Chief of Naval Operations and the Vice Commander in Chief of SAC for making this operation a tremendous success.

Aircraft Maintenance

TSgt Robert J. Fischer, 376 SW, Kadena AB, is SAC's Maintenance Airman of the Month. Currently serving as the NCOIC of the navigation shop, Sgt Fischer's expert knowledge and technical proficiency have greatly enhanced the reliability of the conventional radar and navigation systems installed on his unit's KC/RC-135 aircraft. He manages $430,000 worth of shop electronic test equipment, providing test stations for all flight line, shop training, and maintenance actions. His test equipment preventive maintenance program has resulted in zero defects during all inspections for the past six months. Sgt Fischer is also the inflight maintenance

SSgt Dale A. Warren

SrA Brett C. Maki

TSgt Robert J. Fischer

technician for the shop. He flies with the mission aircrew when problems cannot be duplicated or the specific malfunction cannot be isolated during ground operations. He has been 100 percent successful in finding and repairing these types of problems. Sgt Fischer's resourcefulness ensures reliable radar and navigation systems despite austere conditions or complex problems.

Sgt Fischer is an outstanding trainer. As a result of his carefully arranged shop environment and training program, the navigation shop has achieved two perfect bimonthly evaluations under the maintenance standardization and evaluation program. All tasks, supervisory evaluations, on/off equipment inspections, and general support equipment checks by the quality assurance branch were rated error free.

Missile Crew

McConnell AFB's Crew R-133, consisting of Capt Robert L. Robinson, MCCC; Capt Harold D. Chew, DMCCC; A1C Thomas T. Gottschall, MSAT; and A1C Charles E. Gordon, MFT; is the SAC Missile Crew of the Month.

During a standardization/evaluation inbrief, the complex lost commercial power. The complex failed to automatically transfer to standby power. The crew immediately entered the emergency manual power transfer. Their decisive and proper reaction to this situation prevented extensive recalibration and repair of missile complex communications and vapor sensing equipment, as well as limiting loss of emergency war order traffic.

Also during this alert, the crew heard a loud grating noise accompanied by smoke, a burning odor, and sparking inside the HF radio system equipment rack. They immediately entered the fire manual corrective action checklist. The fire was isolated and power removed. This action and judgment shown by the crew not only eliminated a hazardous condition but also saved a valuable piece of equipment.

Crew R-133's superior performance speaks loud and clear of their professionalism and dedication to the high standards of knowledge and judgement required of combat crew members.

Flying Crew

Crew E-133, 380 AREFS, Plattsburgh AFB, is SAC's Flying Crew of the Month. Commanded by Capt Theon W. Laney, the crew consists of Capt Von Lohr, CP; Capt Scott J. Ogden, N; and TSgt David K. Harrison, BO. While flying in support of the European Tanker Task Force recently, Crew E-133 was conducting a night air refueling of six F-4's over Germany. Capt Lohr was flying this particular mission. While the second receiver was refueling, the left half of the cockpit suddenly went black, the airplane started a slight descent and the receiver called for the pilot director lights. Capt Lohr quickly called "breakaway." The number three generator and buss had tripped off line causing the loss of the autopilot, pilot's instruments and lighting, navigator's N-1 compass, boom operator's gauges and lighting, the receiver director lights and aircraft external lighting. While Capt Lohr flew the airplane, Capt Laney consulted the Dash One and tied the number three buss to the two remaining generators. The receiver was cleared to the contact position, but as he approached, the number three buss again tripped. In total darkness and without gauges, the boom operator backed the receiver out to a safe distance. With the number three buss permanently lost, Capt Laney terminated the mission and coordinated the emergency with Rhine Control. Since Capt Lohr possessed the only set of usable instruments, he flew the aircraft and navigated back to the landing base in England. The decisive actions and superb coordination by Crew E-133 prevented a possible night air refueling mid air collision and resulted instead in the safe recovery of an aircraft and crew.

Missile Crew of The Month

Flying Crew of The Month

SAFETY CROSS FEED

FLYING SAFETY

Bad Place to Build a Nest

During a recent phase inspection, two ducks and a barn owl were found in the spring ram air inlet scoop on the vertical stabilizer of a B-52. Apparently the barn owl had killed the domestic ducks (who don't fly) sometime earlier and carried them to its refuge. The barn owl expired when taken on an unexpected ride. Fortunately, these feathered passengers were found before they could contribute to a disaster on a subsequent flight.

GROUND SAFETY

Must Have Been an Important Call

After impatiently waiting for a telephone call, an A1C became irritated and rushed out the door. As he neared his car, the telephone rang so he turned and ran back to the house. He tripped on the steps and fell through a glass storm door, sustaining severe lacerations.

Thumbs Down!

An NCO's rifle malfunctioned during target practice. While he was clearing the chamber, the gun discharged, striking his thumb. That cost 17 days in the hospital.

Car – 1, Bike – 0

While riding his bicycle to work, an A1C lost control when a tire caught on a ridge in the road. Thrown into the roadway, he was struck by a PMV which smashed his left arm.

Use the Right Tool for the Job

A SrA working under his car used an unsuitable jack to support it. The jack slipped, the car fell and the airman was lucky to escape with five broken ribs.

Why Not Wear the Belt

An NCO moved his seat belt to close the door, failed to put it on and subsequently fractured his left wrist when he fell from the moving vehicle.

Trigger Never Did That to Roy

A Sgt was mounting his horse when the animal reared, threw him to the ground, and then fell on him, fracturing two ribs and causing multiple lacerations.

Didn't Really Mean to do That

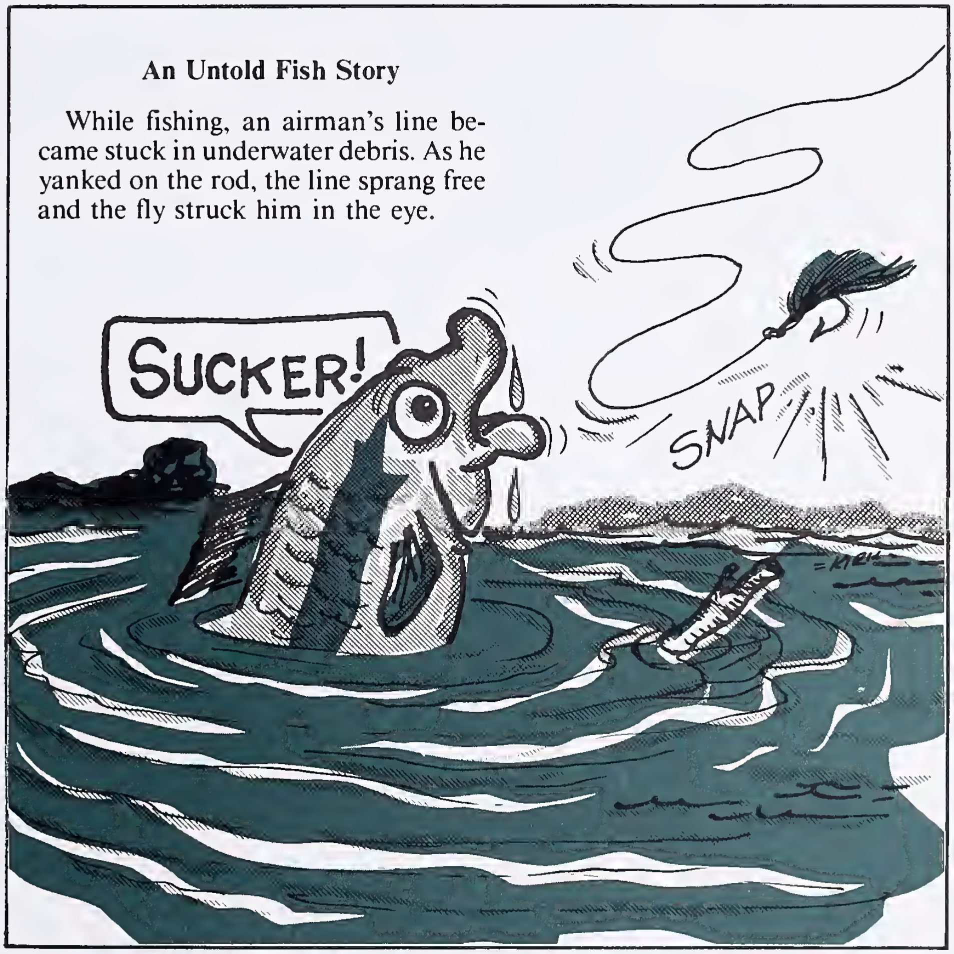
An A1C carefully donned a helmet, leather coat, gloves and heavy boots prior to mounting his motorcycle — and then rode straight into a parked truck, suffering a ruptured spleen.

Self-Inflicted Wound

After placing a loaded hand gun on his vehicle's dash, an A1C got out and slammed the door. The gun fell from the dash and discharged a round which went through the vehicle door and struck the airman's thigh.

An Untold Fish Story

While fishing, an airman's line became stuck in underwater debris. As he yanked on the rod, the line sprang free and the fly struck him in the eye.



WEAPONS SAFETY

"Assumption: The Prelude to a Mishap"

A class of aircraft armament systems students was being instructed on weapons loading. The demonstration required that four stations on the aircraft be shorted and pinned. The instructor noted two stations in the proper configuration and assumed the other two were as well. Continuing with the demonstration, he got a rude surprise when the improperly safed system did its thing.

OOPS!

In last month's Combat Crew, photos of "Bomb Comp" trophy winners from RAF Marham and Grand Forks AFB (page 22) were inadvertently flopped. Our apologies to the individuals involved.

T-37'S DO IT ALL DAY . . .

Cont'd from page 13

This sortie provided me with several valuable insights. First of all, the statement, "It can't happen to me" was verified. It didn't happen to me; it happened to the nav. Next time, however, I think I'll take the few extra minutes to ensure my helmet fits properly. (Amazingly, the mask marks on my face disappeared in just a few hours.)

Finally, what about the old adage, "T-37's do it all day?" I happen to have a brother-in-law who is a T-37 UPT instructor at Reese. He has verified the fact that T-37's do, in fact, fly unpressurized all day long. Unofficially, he let it slip that their maximum duration is in the area of a phenomenal 1.5 hours. We had been at altitude almost twice that long. In the case of our navigator, I recalled that physical exertion makes you even more susceptible to the bends. The nav had been the only crew member out of his seat, and he had moved around the lower compartment quite a bit.

Our decision to press on was admittedly a judgment call. We were within the provisions of Air Force regulations to do so. I've been involved in similar situations, with no adverse affect to any crew member. I also know of a crew from a previous base who pressed on during a Red Flag mission, and they ended the flight with not one, but three crew members suffering from various physiological symptoms.

Shortly after that incident, SAC HQ sent a message to all its units, emphasizing that "crews should not attempt to prolong flight at altitude with an unpressurized cabin, unless dictated by operational necessity." I can't give a definition for **operational necessity,** but I can tell you that you should give serious thought towards the hazards involved in unpressurized flight.

Let's put to rest the misleading philosophy that "T-37's do it all day" and realize that we're not T-37 crew members. Our bomber/tanker sorties are of much greater significance. If your crew faces a similar situation, be sure your decision is made with an awareness of all the facts.

Missileer's Model . . .

Cont'd from page 21

Now Zilesky raced back through his model: Life still needs some clean up, no EWO, no Security, no Faults. As Zilesky pondered on "Other" the flight security controller called.

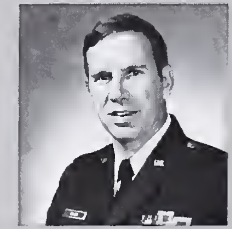
"Sir, just wondering if you were asleep down there, those trips at two and five are screaming about the holdup."

Zilesky started to explain but then dismissed the idea — he wouldn't understand anyway. "I need the facility manager and the cook to the equipment building for a power problem, tell the teams I'll get right with them."

LESFO is a model used by missile crews for as long as anyone can remember. The author is forgotten, but the merit of the model has survived the test of time. Its simplicity and universal applicability have pulled many a crew member through evaluations and real life situations. The most common myth about the model is that it is for EWO nuclear detonation scenarios. It works remarkably well for any complex problem, so don't wait for an EWO situation to use it. If multiple events at any time require priorities to be set, then LESFO will work. New events or status changes may force you to reenter the model at step one. As events are resolved, run through the model again from the top to see if you have missed anything important. If you are not a missileer then perhaps you can adopt some facsimile of the LESFO model as a basis for prioritizing actions in complex scenarios. Using such a model emphasizes safety and ensures time critical actions are accomplished in the most logical order possible.

Recent actions have reduced communications system alarm noise in LCCs and a remote SACCS alarm reset pushbutton has been installed at the deputy's console (WS133B LCCs) to improve crew reaction. Work is also underway to add a remote weapon system alarm reset pushbutton at the deputy's console in WS133AM LCCs. —ED.

ABOUT THE AUTHOR



Captain Eller is a missile instructor at Vandenberg AFB. He was a missile crew member and wing instructor at Whiteman AFB from 1981 to 1985.

SAC SAFETY SCREEN

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW AFR 127-2/SS1.*

343 SRS, Offutt Crew S-31: R1 1Lt Jim Blaich, IR-2 Capt Rick Siebert, IR-3 Capt Mike Illerbrun

70 AREFS, Grissom Crew R-183P: P 1Lt Michael T Meyer, CP 1Lt Scott S Peterson, N 1Lt Christopher D Wilson, BO TSgt Lorin A Derry

70 AREFS, Grissom E-190P: P Capt Donald P Sewell, CP Capt Kevin C Scoble, N 1Lt Raymond L Agurkis, BO Sgt John T Weber

91 AREFS, McConnell Crew E-111: P Capt Peter M Wilson, CP 1Lt Richard A Taylor, N 1Lt David C Ham, BO Sgt Henry E Wayne

384 AREFS, McConnell Crew E-158: IP Capt Clyde T Anderson, CP 1Lt Michael L Ladaw, N 1Lt Roger R Perret, BO Sgt Michael J Perry

328 BMS, Castle Crew IT 35: IP Capt Charles Wolden, IRN Capt Emmett Palmer, IEW Capt Walter Wolf, IAG SSgt Dalmot Wilfong

93 AREFS, Castle Crew IT-10: IP Maj Charles A Brown, IN Capt Randy L Buckland, IBO TSgt Christopher D Sadler

62 BMS, Barksdale Crew R-17: P Capt Keith E Cottrill, CP Capt David M Blizzard, CP 1Lt David L Anderson, RN Capt Robert C Olmstead, N Capt Robert Gomez, Jr, EW 1Lt James V Heckman, G SSgt Lowell E Chalk

71 AREFS, Barksdale Crew S-116: IP Capt Robert C Johnson, CP Capt James R Kasbohm, IN 1Lt Mark R Cobin, BO TSgt John B Stanford

71 AREFS, Barksdale Crew R-112: P Capt Virginia T Udell, CP 1Lt Timothy W Harris, N 1Lt Richard M Nehls, IBO SSgt Kenneth P Fabiny

32 AREFS, Barksdale Crew: P Maj Howard S Maw, CP 1Lt Roger S Winter, FE TSgt Henry A Wright, BO SSgt James M Boozer

78 AREFS, Barksdale Crew: AC Capt Philip G Myers, P Maj Douglas J Morin, FE TSgt Daniel C Hill, IBO MSgt Joel E Montgomery, BO SSgt Roland E Barton

596 BMS, Barksdale Crew S-92: P Capt Wendell L Griffin, CP 1Lt Blake L Donald, RN Capt Marlon W Johnston, N 1Lt Bradford W Jensen, EW Capt Peter R Keck, G SSgt John Perry

909 AFRES, Kadena Crew R-131: P Capt Charles F Miller, CP 1Lt Steven R Andress, N Jeffrey H Fields, BO SSgt Clyde A Soumas, Jr

92 AFRES, Fairchild Crew E-184: P Capt Thomas B Melancon, CP 1Lt Kenneth J Guevara, N 1Lt Matthew F Laiho, BO SSgt Glen F Forward

92 AREFS, Fairchild Crew E-172: P Maj William T Miller, CP 1Lt Brian M Hansen, N 1Lt Kenneth L Smith, BO SRA Samuel K Elliott

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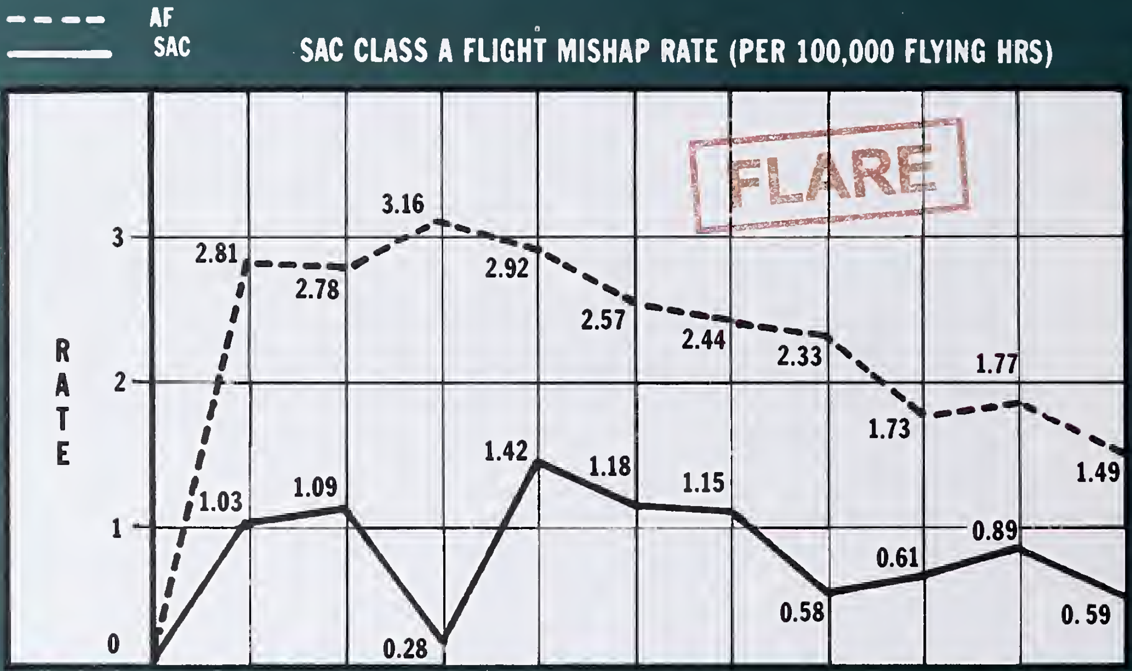
flying safety

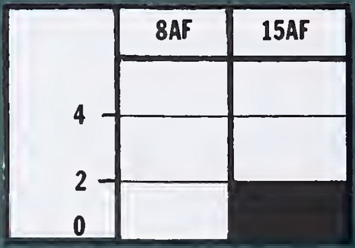
SAC CLASS A FLIGHT MISHAP RATE (PER 100,000 FLYING HRS)



FLARE

MISHAPS	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
AF	87	90	98	94	81	80	78	59	80	53
SAC	5	4	4	5	4	5	2	2	3	2

1985 SAC FLIGHT MISHAPS



1985 CLASS A MISHAPS	
RC-135T	FEB
KC-135A	AUG

CLASS B	
1985	0
FLYING HOURS	
1985	340,600